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# USSR Report

SCIENCE AND TECHNOLOGY POLICY

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30 November 1984

## USSR REPORT

### SCIENCE AND TECHNOLOGY POLICY

#### CONTENTS

PRAVDA Views Social Aspects of S&T Progress (Prof R. Yanovskiy; PRAVDA, 28 Sep 84).....	1
Increasing Efficiency of Economic Research (V. Dubov; EKONOMIKA I ZHIZN', No 6, Jun 84).....	7
Expert Appraisal in Preparing Planning Decisions (V. Kim; EKONOMIKA I ZHIZN', No 5, May 84).....	13
Works Vying for Komsomol Prizes in Science, Technology (KOMSOMOL'SKAYA PRAVDA, 27 Jul 84).....	19
Seminar on Problems of Socialist Competition in Science (A. Zolotarev (Kharkov), V. Andriyenko; EKONOMIKA SOVETSKOY UKRAINY, No 6, Jun 84).....	29
Forecasting and Long-Term Planning of S&T Progress in Latvian SSR (M. Raman; NAUKA I TEKHNIKA, No 8, Aug 84).....	35
Problems in Development, Production of Innovative Accessories (MOSKOVSKAYA PRAVDA, 1 Jun 84).....	41
Pokrovskiy Book on Scientific and Technical Progress Reviewed (A. Kolesnikov, N. Lavrenov; PLANOVYE KHOZYAYSTVO, No 7, Jul 84).....	45
Mathematical Method Proposed for Predicting Equipment Needs (I. Popova; PLANOVYE KHOZYAYSTVO, No 8, Aug 84).....	49
Report on Annual Meeting of Georgian Academy of Sciences (ZARYA VOSTOKA, 5 Apr 84).....	54

PRAVDA VIEWS SOCIAL ASPECTS OF S&T PROGRESS

PM091101 Moscow PRAVDA in Russian 28 Sep 84 First Edition pp 2, 3

[Article by Doctor of Philosophical Science, Rector of the CPSU Central Committee Academy of Social Sciences, Prof. R. Yanovskiy, under the rubric "Theoretical Matters": "Socialism, Science, and People"]

[Text] The acceleration of scientific and technical progress is a notable feature of the modern era. Mankind is currently in a long historical period of scientific and technical revolution. Its achievements are most fully manifested in the conditions of the socialist system. This is natural. After all, the communist party's chief aim and real socialism's main task are to satisfy as fully as possible a person's needs and requirements and mold his abilities on the basis of the maximum development of production and utilization of the achievements of science and technology, culture and education.

At first glance it appears that the scientific and technical revolution is not directly linked to the solution of personal spiritual problems. But that is not so. Scientific knowledge provides a broad view of things and of the phenomena of surrounding reality, helps to identify the more general and deeper aspects of life and interpret and generalize practical achievements, and in many respects shapes social consciousness. Political, labor, and moral education are inconceivable without these spiritual phenomena. And it is here that science's educational function, party commitment, and humanity are clearly evident.

The times we are living in are characterized by a transition to a nature, higher stage of socialist development as well as by the exacerbation of the ideological, political and economic struggle between the two systems in the international arena. This makes us look again at the aims of science and its place in social consciousness and social practice.

At no time in the past has the potential of science been so great, and never before has the intelligentsia, which is now a large strata of the working people, had so massive a responsibility as in the period of developed socialism.

"The very nature of the tasks facing our society," Comrade K. U. Chernenko noted at the Jubilee Plenum of the USSR Writers Union, "offers truly unlimited

scope for the creative effort and energy of all detachments of the Soviet intelligentsia." Exerting a tremendous influence on social consciousness and on society's spiritual life, the intelligentsia is expected to actively aid the development of the Soviet person's scientific philosophy, moral purity, and ideological steadfastness and contribute the forging of an organic link between the achievements of the scientific and technical revolution and the advantages of the socialist system of management.

Scientific and technical progress has already led to a considerable updating of the entire national economy. We can expect even more profound changes in the sphere of material production in the final decades of the 20th century.

The distinctive feature of the modern production process is its increasing intellectual content. The increased efficiency of the national economy and the intensification of production are very closely associated with the accelerated assimilation of scientific discoveries and the achievements of technological research. And, of course, with the reorganization of economic thinking.

It should be noted in particular that the scientific and technical revolution is primarily a revolution in the sphere of technology. Mechanization and automation play a significant part in it, but the change in the actual method of handling the objects of labor is becoming increasingly significant. Substantial changes in the economy result from new technology.

The switch to new technology means not only purely economic problems but also the education of people themselves. In fact, modern production "perceives" each working person more acutely than before, needs the breadth of his knowledge and businesslike, quick, and correct decisions. It depends more than ever before on these qualities, since scientific and technical progress is involving a larger number of people in the handling of powerful equipment: nuclear power stations and spacecraft, rolling mills, computers, and entire automated enterprises. You simply cannot work in this area without substantial education and vocational training and the appropriate level of consciousness and moral standards.

Let us consider them. Clearly, more and more workers are switching to labor that ensures the normal functioning of automated technological systems. A comparatively small number of operators is replacing a large number of people working with machine tools, of installation workers and fitters. Troubleshooters, engineers, maintenance staff, and workers in production units involved in trials and experiments are now acquiring crucial significance, having previously performed an auxiliary role.

Most of these professions, created by the scientific and technical revolution, are associated with increasing job complexity, but the very content of the work is undergoing qualitative rearrangement. In representative work places in scientific-industrial production much more significance is being attached to original operations combining intellectual and physical effort, and it is sometimes necessary to tackle the most unexpected tasks. The people actually involved in modern production are increasingly focusing attention on their

own "human functions," finding optimum ways out of complex technical situations, developing new technology, and so forth. As a result of the switch to new, advanced techniques people are increasingly able to break away from the processes of indirect production, are turning from performers into genuine creators, and are increasingly, to use K. Marx's words, "subjecting the forces of nature to common reason." (K. Marx, F. Engels, Works Vol 46, p 218).

But if the labor becomes more complex, the nature of vocational training also changes. Breadth and depth of knowledge of one's speciality become an essential condition of high skill. And it must be backed up by general secondary education and a comprehensive technical base. That is, the national economy's switch to the intensive path of development and the extensive introduction of scientific achievements demand an improvement in the entire system of education in this area, since extensive factors--extending the training period, increasing the work load--have, of course, been exploited to the fullest. It is the express purpose of the school reform started this year to solve many of these problems.

The time has come when narrow specialization by any skilled worker or engineer is no longer satisfying society's needs. That is why the role of a worker's self-organization [Samoorganizatsiya] is increasing and their responsibility and initiative are so essential. But people's responsibility and reliability are fundamentally different from equipment reliability. Much depends here on their education. Conscious discipline and responsibility, professional expertise, and a sound philosophical and life stance are decisive factors for all working people in the solution of tasks set by the party for future decades. For most working people the desire to contribute to their solution is an important stimulus to disciplined, highly productive work. Just as significant is the fair application of the socialist principle of payment by quantity and quality of labor.

At the same time, in social relations and in individual behavior elements persist of individualism and of mercenary attitudes and mentality. These and other phenomena connected with the action of various factors, including shortcomings in ideological and educational work, sometimes find a fertile medium in the excessive demands and egotistical habits of certain individuals. We still lack persistence and aggression, sharpness and precision in the struggle against these phenomena. We need a great deal of scientific and propaganda work and close collaboration between party workers, scientists, journalists, and all honest workers. Sectors of social knowledge such as Marxist-Leninist education, ethics, social psychology, and the entire complex of social sciences have a big contribution to make to this.

In the conditions of the scientific and technical revolution the relationships between the different spheres of human activity are intensifying and becoming more multifaceted. Therefore, when talking about human development it is not enough just to stress the role of scientific and technical progress without taking into account the correlation between it and social and spiritual progress. Modern man's ties with society and the conditions of his everyday life and development are expressed through the medium of the social-class, national, and demographic structure.

It is in the solution of human problems that the advantages of the socialist system are most strikingly and consistently manifested. Capitalism has not solved and is incapable of solving the real problems of human relationships; it contributes to people's alienation and to the development of egotism and indifference. Whereas socialism, as a society which intrinsically combines in its development the onward march of history and the realization of humanitarian ideals, is solving these problems consistently and increasingly fully.

The shaping of the new man and the comprehensive, harmonious development of the individual are not just one of the main tasks of communist building; they are its supreme goal. This is natural. After all, when a society is confronted with qualitatively new tasks--and that is what the tasks of improving developed socialism are--their solution requires a new level of social consciousness.

We need as Comrade K. U. Chernenko has observed, "persistent work to increase the masses' consciousness, to bring about a definite reorientation, if you will, of social consciousness so that it assimilates the party's new ideas more quickly and resolutely rids itself of obsolete, backward views."

And the social sciences have a key role to play here. The specific nature of social knowledge is that it shapes the fundamental and most general philosophical, political, and economic guidelines for people's practical and theoretical activity and molds social consciousness, rational demands, interests, and the motives for people's behavior. By dint of this it contributes to the successful implementation of the political, socioeconomic, and ideological activity of the Communist Party.

At the present stage the social sciences are faced with qualitatively new, crucial tasks. Basically the tasks are to intensify the influence on the solution of topical political, economic, and social problems and to strengthen the link between scientific research and practical ideological and educational work. But the chief task is to study in depth the machinery involved in the functioning and improvement of mature socialism and the laws governing its advance toward communism and to address the problems presented by the practice of our society's development.

As for the vital features of the present-day social situation, one must stress, first, the increased interdependence between the fulfillment of the most important economic programs and the standard and quality of ideological and political education work. There can be no effective advances in the socioeconomic sphere today if there is a lag in the ideological and educational sphere.

Second, mention should be made of the intensification and complexity of social processes and the abundance of multifaceted, often contradictory information absorbed by modern man. Mention must be made in this connection of the increasing complexity of the actual process of shaping the individual and of the dialectics of social and individual consciousness.

The influence of social processes on social consciousness and its various forms has also become more dynamic. Such phenomena as the increasing complexity of economic ties and shifts in distribution relations and consumption in some cases contribute to the social and the moral and professional growth of the individual and in other cases can lead to the appearance of various harmful egotistical and individualist elements (departmentalism, parochialism, inflated figures, reporting money-grubbing, and so forth).

An important and in many respects determining factor in the present situation is the sharp exacerbation of the ideological struggle and the sophistication and diversity of the forms in which it occurs. Those aspects and facets of our way of life which never used to be regarded as significant in the practice of political education are carrying an increasing ideological "burden."

It is the need to take into account all the features of the present-day ideological situation that makes it necessary to strengthen the social sciences' ties with the practice of communist education. Social scientists have not only to investigate more vigorously the social laws and trends of development, but also to learn how to join forces with party committees and labor collectives and give them prompt and skilled assistance.

By studying the dynamic and nondynamic features of social phenomena and elucidating the trends and laws of their development, social scientists are developing Marxist-Leninist theory as a fundamental methodological basis for the solution of topical tasks of developed socialism. It is equally important to bring the results of their research up to the requisite "technological" level and to elaborate applied concepts and appropriate methods of introducing them. Only with their help can theoretical propositions be translated into the concrete practical language.

Under the leadership of the party committee scientists are successfully joining forces in a number of regions of the country of "home" the results of some research and established a direct link between basic studies and ideological practice. In Belorussia, for example, it means work in residential areas: in Azerbaijan and Georgia it is public opinion studies and questions of social planning; in Tyumen Oblast it is the control of moral processes in labor collectives. Useful experience of integrating theoretical research and practical studies has been accumulated in the socialist countries--for example in the GDR and Bulgaria. The task now is to considerably improve and make extensive use of targeted program planning methods in the social sciences.

The need for comprehensive research is one of the topical questions relating to increased social science efficiency that must be highlighted. As a rule, every fundamental problem is a multiple one and its practical implementation requires changes in many elements of the production and nonproduction sphere. The creation of an effective comprehensive program of communist education at individual enterprise level presupposes not only good organization of training in the political and economic organization network--which is very important too, of course--but also the improvement of a number of complex social factors

in the sphere of labor, everyday life, and leisure. Special attention must be paid to increasing the socioeconomic effectiveness of and ensuring a high growth rate in labor productivity.

The solution of the wide range of problems of "scientific anthropology" makes great demands on a scientists' philosophical methodology and his professional and civic responsibility. In present conditions it is not enough just give a "verbal" explanation of party policy. Although very important, it is not the social scientists' only task. By making active use of the press, radio, television, and all forms of mass training, it is necessary to effect profound positive changes in economic thinking and labor activity and to contribute to the improvement of the moral climate and the shaping of political culture.

In modern conditions K. Marx's well-known proposition that philosophers "have only explained the world in various ways, whereas it is a matter of changing it" is acquiring even richer and more specific content.

So social scientists must not only acquire the requisite volume of professional knowledge and Marxist-Leninist methodology but must also have a sound grasp of the CPSU's domestic and foreign policy and be able to cogently defend their position and be active political fighters.

In solving the problem of the individual from the positions of historical materialism, Marxism-Leninism has established a genuine scientific foundation for an analysis of the dialectical link between the development of society and the education of people. V. I. Lenin always associated the thesis of a person's comprehensive development with the socialist transformation of society, with a change in social relations, and with social and scientific-technical progress.

Of course, the education of millions of people and alteration of their mentality and morals is primarily a political task. But it is also a educational task. In conditions of developed socialism society is now at the stage of development where it is posing and tackling the problem of changing people, comprehensively developing their creative inclinations, and making the transition to a higher level of development which determines the individual's political, social, and cultural makeup as well. The educational tasks have now come to be seen as being part and parcel of sociopolitical and state tasks. The demands and structural components of the Soviet educational system and, above all, education's tasks and aims stem from the theoretical and political tasks that the Communist Party and Soviet people are tackling in present-day conditions.

The tough tasks that have to be solved in the economy, in science and technology, and in other spheres of social life make high demands on people and consequently, on educational work. For we cannot make successful progress without the baking of profound knowledge, a high level of consciousness and culture in all working people, and the massive spiritual and creative potential amassed by generations of Soviet people. The fuller mobilization of this potential can impart powerful impetus to our development on the path of improving developed socialism.

## INCREASING EFFICIENCY OF ECONOMIC RESEARCH

Tashkent EKONOMIKA I ZHIZN' in Russian No 6, Jun 84 pp 11-13

[Article by Candidate of Economic Sciences V. Dubov, deputy chief of the Science and Technology Administration of the Uzbek SSR State Planning Committee: "How to Increase the Efficiency of Economic Research"]

[Text] Economic science is a most important component of the progress of social production. Its role in the solution of practical problems, which are of vital importance for the economic strategy of the party, is stressed in the decree of the CPSU Central Committee "On Increasing the Role of the Institute of Economics of the USSR Academy of Sciences in the Elaboration of the Key Questions of the Economic Theory of Mature Socialism."

In our republic the Institute of Economics, the Institute of Cybernetics and Computer Center and the Council for the Study of Productive Forces (SOPS) of the Uzbek SSR Academy of Sciences, the Scientific Research Institute of Economics (NIEI), the Republic Center of the Scientific Organization of Labor (RTs NOT) and the Computing and Data Processing Center (IVTs) attached to the Uzbek SSR State Planning Committee, the Central Asian Scientific Research Institute of Agricultural Economics (SANIIESKh) of the Central Asian Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, the affiliate of the Scientific Research Institute of Labor and the All-Union Scientific Research Institute of Consumer Demand and Market Conditions, the Tashkent Institute of the National Economy (TINKh), about 60 chairs of economic specialization of other higher educational institutions, as well as the economic subdivisions of scientific research institutes, planning, planning and design and technological organizations are conducting scientific research work of the economic type.

More than 60 major problems, which encompass various aspects of the theory and practice of the socioeconomic development of the republic, are being elaborated in these collectives. The total number of scientists and scientific teaching personnel, who are engaged in the study of problems of the economic type, comes to about 2,300, or 7.3 percent of the scientists of the republic, including more than 1,200 doctors and candidates of sciences.

In recent years in the work of economic subdivisions the orientation toward the needs of planning practice has strengthened, the level and efficiency of research have increased. The ties of scientific organizations with the Uzbek

SSR State Planning Committee have become noticeably stronger, the demands of planning organs on the soundness of the recommendations and proposals of scientists on the problems of the socioeconomic development of the republic have increased. Now all the most important economic developments are discussed and approved at the meetings of the Collegium of the State Planning Committee and of the State Planning Committee.

Among the significant economic studies of recent years one should note the developments of the Kibernetika Scientific Production Association on the introduction of the first section of the Uzbek SSR Republic Automated Control System, the proposals of the Scientific Research Institute of Economics attached to the Uzbek SSR State Planning Committee on preplanning elaborations of the basic directions of the economic and social development of the republic for the 11th Five-Year Plan, the materials of the Council for the Study of Productive Forces of the Uzbek SSR Academy of Sciences on the problems of the diversion to Central Asia of the waters of Siberian rivers, as well as the Comprehensive Program of Scientific and Technical Progress of the Uzbek SSR to 2005 and the Master Plan of the Development of the Productive Forces of the Republic to 2000.

At the same time the content and effectiveness of the scientific research activity of the economic subdivisions of the republic still do not meet the requirements, which were set for economic science by the 26th CPSU Congress, the 20th Congress of the Communist Party of Uzbekistan and the subsequent CPSU Central Committee plenums. The shortcomings in the work of the Institute of Economics of the USSR Academy of Sciences, which were noted in the decree of the CPSU Central Committee, can also be fully attributed to the activity of our scientific research organizations and higher educational institutions.

It is still impossible to recognize as adequate the contribution of science to the solution of the urgent problems of economic theory and management practice. The laws and trends of the development of our society are being analyzed, with allowance made for the specific nature of the republic, without proper depth. The specific ways and means of overcoming and eliminating the existing contradictions and shortcomings are being poorly substantiated. The scientific reserve of research, which is called upon to promote the changeover of the economy of the republic to the intensive means of development, the accomplishment of the tasks of the management of scientific and technical progress, the acceleration of the replacement of productive capital at a higher technical level and the improvement and reform of the economic mechanism of management and planning, is inadequate. Economic science for the present is still not providing with the necessary reserve the preplanning developments in the area of the formation and development of territorial production complexes. At the corresponding scientific institutions there are still quite a number of unproductive subdivisions, which for years are dependent on the state and on laboratories and departments, which operate inefficiently.

Such a situation in many ways is explained by the shortcomings of the established system of the management and planning of scientific research of the economic type. The existing system of administrative supervision envisages the division of scientific activity into three spheres: the

academic sphere, the sphere of higher educational institutions and the sectorial sphere. Each of them has its own management organ--the Presidium of the Academy of Sciences, the ministry or the department, which carries out supervision within its own sphere and is independent of a similar organ of the other sphere. As a result unjustified duplication and parallelism are observed in the structure and the research being conducted.

Thus, they study the questions of the forecasting of the growth of the population and the formation and use of manpower resources at the Institute of Economics and the Council for the Study of Productive Forces of the Uzbek SSR Academy of Sciences, the Scientific Research Institute of Economics attached to the Uzbek SSR State Planning Committee, the Uzbek Affiliate of the Scientific Research Institute of Labor, as well as the Population Scientific Research Laboratory of Tashkent State University. However, in spite of such a large detachment of researchers, the demographers of the republic have never been able to present when approving the Master Plan convincing scientific proof for the refutation of the understated calculations of the size of the population of the republic to 2000, which have been accepted by union organs.

A similar situation has also formed with the elaborations on the improvement of the structure of industrial production, the formation of the fuel and energy planning balance, the development of scientific and technical progress and so on.

Scientific forces and material resources at times are dispersed for the fulfillment of minor themes, which are unimportant for the national economy and science. On the average not more than three or four people are employed in the fulfillment of one theme. As a result the potential of scientific organizations of the economic type, which should be concentrated on the solution of such problems as the comprehensive economic and social development of the republic, oblasts and cities, the more complete combination of sectorial and territorial planning, the identification and commitment to the economic turnover of reserves and additional sources of the increase of the volumes and efficiency of production and the increase of the scientific soundness of plans, is being used inefficiently.

Apparently, it is possible to explain by this the fact that in the republic there are no large-scale economic developments and proposals, which have been supported by union organs and are aimed at the conducting of economic experiments and the checking of the economic mechanism on the scale of a sector or region.

The situation is also being aggravated by the fact that in the republic a coordinating plan of scientific research in the area of the economic sciences is not being drafted.

In order to eliminate the existing shortcomings and to increase the assistance of economic science to planning and economic organs, it seems necessary to improve the planning and organization of the entire system of economic research in the republic and to turn it into an integral part of the mechanism of planning and management. Under the conditions of the strengthening of the

goal program methods of planning this is one of the basic prerequisites of the achievement of a qualitatively new level of planning work.

The improvement of the planning of scientific research in the following directions should become the central link of the increase of the efficiency of scientific research of the economic type:

the strengthening of the centralized principles on the basis of the drafting of a Republic Coordinating Plan of Economic Research, which should become a component of the corresponding plan which envisages research in the area of the natural and social sciences;

the intensification of scientific specialization and the increase of the concentration of the forces and resources of scientific institutions on the most important problems of the socioeconomic development of the republic;

the assurance of the cooperation of the scientific institutions of the economic type of the Academy of Sciences, the Central Asian Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, the Ministry of Higher and Secondary Specialized Education, the Uzbek SSR State Planning Committee and various ministries and departments.

The Republic Coordinating Plan of Scientific Research in the Area of the Economic Sciences should be formulated and approved by the Uzbek SSR Academy of Sciences jointly with the Uzbek SSR State Planning Committee. When drafting it, it is important to ensure the efficient combination of regional, sectorial and departmental interests. Here the established experience of research, the available scientific reserve and the resource potentials of individual collectives should be taken into account. Such a statement of the question will require of the Uzbek SSR State Planning Committee and the Uzbek SSR Academy of Sciences the serious study of the proposals of ministries, departments and scientific organizations on the thematic problem plan of economic research and the careful evaluation of their conformity to the needs of economic practice and the orders of central ministries and departments. This will increase the responsibility of those, who perform the role of the "client," for the correctness of the choice of the problems of economic research of a sectorial nature.

For the purposes of eliminating duplication and increasing the efficiency of economic research it seems advisable to specialize the subdivisions of the economic type in the following directions:

the Institute of Economics of the Uzbek SSR Academy of Sciences--theoretical and procedural problems of regional economics under the conditions of mature socialism; the elaboration of the theoretical bases of the comprehensive improvement of the management and planning of the national economy of the republic, the organizational structures of management, the coordination of the physical-material and value proportions, the strengthening of cost accounting relations, the increase of the role of economic levers and stimuli in the development of production; the study of the problems of production under the conditions of the intensive means of development and the acceleration of scientific and technical progress.

The Council for the Study of Productive Forces of the Uzbek SSR Academy of Sciences--the problems of the long-range development and distribution of the productive forces of the republic; the formation of the Comprehensive Program of Scientific and Technical Progress for 20 Years and the Master Plans of the Development of the Productive Forces of the Republic.

The Kibernetika Scientific Production Association of the Uzbek SSR Academy of Sciences--the optimization of the development and distribution of individual sectors of the national economy; the use of mathematical economic materials in economic research and planning calculations.

The Scientific Research Institute of Economics attached to the Uzbek SSR State Planning Committee--the substantiation of preplanning projections of the socioeconomic development of the republic for the future--with a territorial and sectorial breakdown; the improvement of the methods and organization of territorial planning.

The Central Asian Scientific Research Institute of Agricultural Economics of the Central Asian Department of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin--the agrarian economic problems of the development of the republic: the formation and development of the agroindustrial complex.

The Tashkent Institute of the National Economy of the Uzbek SSR Ministry of Higher and Secondary Specialized Education--the problems of the increase of the efficiency of social production in the most important sectors of the national economy of the republic.

The Uzbek Affiliate of the Scientific Research Institute of Labor--the problems of the reproduction of manpower in the sectors of the national economy; the internal production reserves of the increase of labor productivity; the norm setting and organization of labor; the improvement of socialist competition.

The Uzbek Affiliate of the All-Union Scientific Research Institute of Consumer Demand and Market Conditions--the questions of the meeting of the effective demand of the population for consumer goods; the methods of forecasting the conditions of trade and demand.

The content of the Republic Coordinating Plan should be subordinate to the elaboration of forecasting materials for the Comprehensive Program of Scientific and Technical Progress for 20 Years, the Plan of the Development and Distribution of Productive Forces and the Basic Directions of the Economic and Social Development of the Republic.

Such an approach will make it possible to elaborate general concepts of the socioeconomic development of the republic in the long-term and intermediate-term future on the basis of comprehensive research and studies of the economic problems of sectorial and territorial development.

The Republic Coordinating Plan will be of a comprehensive nature, and the problems in it, which are to be elaborated, will be interconnected. More

special questions will be synthesized in the general comprehensive problems. Here it will be easier to observe the sequence of the inclusion of assignments in the thematic problem plan of the scientific research work of ministries and the scientific organizations subordinate to them within the allocated limits of financing.

The dates of the completion of the scientific research should be timed to coincide with the dates of the drawing up of the above-indicated set of plans or should even lead them slightly. The role of science as a "prospector" of future events will appear precisely in this. This is all the more important as the proposals on individual aspects of the long-range development of the economy of the republic are submitted to the USSR State Planning Committee, as a rule, only with the drafts of the plans.

It seems advisable to assign the organizational support of the supervision and management of economic research to the Council for the Coordination of Scientific Research of the Economic Type, which operates with the rights of a structural subdivision of the Republic Council for the Coordination of Scientific Research Work in the Uzbek SSR. The directive organs of the republic and interested organizations should receive extensive representation within the council.

The staff of the Department of Philosophical, Economic and Legal Sciences of the Uzbek SSR Academy of Sciences will be its working organ, problem councils for the corresponding directions of economic research will also be a part of it.

The activity of the Council for the Coordination of Scientific Research of the Economic Type should be governed by a specially elaborated statute and should envisage not only questions of planning, but also the organization of studies of the most important economic problems in accordance with the comprehensive programs, the carrying out of the monitoring of their fulfillment, as well as the submittal to the Uzbek SSR State Planning Committee and other directive organs of proposals on the use of the results of the conducted economic research and development.

It is important to implement as quickly as possible the necessary measures on the radical improvement of the planning and management of economic research in the republic, since this year the ministries and departments are performing active work on the formation of the five-year (for 1986-1990) plan of scientific research work.

The improvement of the organization of scientific research of the economic type on the basis of the coordination and cooperation of work will be an important factor of the increase of its intensification.

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## EXPERT APPRAISAL IN PREPARING PLANNING DECISIONS

Tashkent EKONOMIKA I ZHIZN' in Russian No 5, May 84 pp 5-8

[Article by Candidate of Economic Sciences V. Kim, Chairman of the Experts Commission of the Uzbek SSR State Planning Committee: "The Technical and Economic Expert Appraisal in the Preparation of Planning Decisions"]

[Text] The expert appraisal in the narrow sense of the term is the study of some question which requires special knowledge with the presentation of a justified conclusion. A dictionary of foreign words explains the meaning of the term in this way.

Expert appraisals are of different types. The medical and legal expert appraisals are the most well-known. It is less well-known that the scientific and technical, accounting and other types of technical and economic expert appraisal are used in the management of the national economy.

The technical and economic expert appraisal is an official scientific check of the all-round soundness of proposed decisions in the area of scientific, technical and socioeconomic development and the improvement of the economic mechanism, which are made by management organs within their competence. Such a check concludes with the presentation of a conclusion, which is well-reasoned and has been approved in accordance with established procedure and for the reliability of which the experts bear personal responsibility. Owing to all this the technical and economic expert appraisal serves as an important and effective administrative means of monitoring the quality of the decisions being made on economic matters.

Therefore directive organs are devoting much attention of the questions of the improvement of the work on expert appraisal in central and republic state organs, ministries and departments, enterprises and organizations. In the materials of the 26th CPSU Congress it is indicated that "when preparing decisions on some economic matters or others the different versions should be compared on the basis of not only departmental, but also extradepartmental evaluations. It is necessary to increase the demands on planning organizations, ministries, departments, the State Planning Committee and the State Committee for Material and Technical Supply in regard to the all-round soundness of the decisions being made or proposed by them."

In conformity with these demands and the tasks, which follow from the decrees of the CPSU Central Committee and the USSR Council of Ministers "On Improving Planning and Strengthening the Influence of the Economic Mechanism on Increasing Production Efficiency and Work Quality" and "On Measures on the Further Improvement of Planning Estimate Work," it is necessary to improve significantly the quality of expert evaluations at all the stages of research and development, designing and the formation of plans at any level of the national economy. This applies first of all to the departmental system of expert appraisal, which is most prevalent and encompasses all the sectorial units of the national economy from top to bottom.<sup>1</sup>

Here it is a question of the improvement of the work of not only sectorial (departmental) expert subdivisions, but also all organs, which examine the results of research and development, technical and economic substantiations, designs and estimates, plans of the development and distribution of works, drafts of plans and other materials. These are the scientific councils of scientific institutions, the technical and economic councils of enterprises, the scientific and technical councils and collegiums of ministries and departments, in the work of which scientists and highly skilled specialists are enlisted extensively.

In the solution of intersectorial problems an important role belongs to the interdepartmental expert appraisal, which is made by interested ministries and organizations, as a rule, by the setting up of special joint commissions.

However, in practice it also happens that in the recommendations and decisions, which are adopted on the basis of departmental and interdepartmental expert evaluations, questions are encountered, which do not belong to their competence and therefore cannot be accomplished at the sectorial levels. Moreover, a narrow departmental or regional approach frequently appears in such decisions. In this connection and for the checking of the soundness of the decisions being made on important and major problems a technical and economic expert appraisal is made by the USSR State Planning Committee, the USSR State Committee for Construction Affairs, the USSR State Committee for Science and Technology, the USSR State Committee on Prices and other central union organs.

The USSR State Committee for Science and Technology makes the state expert appraisal of questions of scientific and technical progress and production technology, including the technological part of the designs and estimates of construction projects. The making of an expert appraisal of the designs and estimates for the construction (renovation) of enterprises, buildings and structures, which are subject to approval by the USSR Council of Ministers, is assigned to the union State Committee for Construction Affairs.

The expert evaluation of the remaining construction projects belongs to the competence of USSR ministries and departments and the councils of ministers of the union republics. In the Uzbek SSR it is carried out by the Administration of the State Expert Review of Designs and Budget Estimates of the Uzbek SSR State Committee for Construction Affairs.

The State Experts Commission of the USSR State Planning Committee, which examines preplanning studies on a wide range of questions and problems of national economic importance, plays an important role in the system of the organization of state expert appraisal. For example, in 1982 it examined 106 problems, which include questions of the supply of stocks and the efficient use of mineral raw material, land and water resources, nature conservation, the development of the sectors of the national economy, the construction of individual industrial enterprises and complexes and the introduction of major scientific and technical developments, the diagrams of regional layouts, the master plans of cities and others.

It should be emphasized that the expert appraisal of preplanning studies is one of the integral functions of all the subdivisions of the USSR State Planning Committee and the state planning committees of the union republics. Not by chance did V. I. Lenin link the need to give legislative functions to the USSR State Planning Committee with the important role of its expert evaluations in the settlement of state matters.

With the complication of the process of national economic planning the need arose to establish a special expert subdivision initially in the USSR State Planning Committee, and then in the state planning committees of several union republics. In 1982 the Experts Commission with the rights of a department was also formed within the Uzbek SSR State Planning Committee. As specified in its Statute, it is called upon to promote the increase of the scientific soundness and balance of the drafts of plans, the more complete combination of sectorial and territorial development, the efficient development and distribution of the productive forces of the republic, the successful implementation of the state plans of economic and social development, as well as the dissemination of the advanced know-how of the planning of the comprehensive development of the oblasts and cities of the republic. It bears responsibility for the objective examination of questions, the scientific, technical and economic soundness of expert evaluations, the strict observance of statewide interests and the suppressing of any displays of a narrow departmental and regional approach in the settlement of the questions being examined.

There has been assigned to this subdivision of the Uzbek SSR State Planning Committee the making of an expert appraisal of scientific, predesigning and preplanning materials with the preparation of the corresponding proposals on:

the rates and general economic proportions, the most important social and economic problems of the development of the national economy of the republic;

the diagrams of the development and distribution of productive forces, the problems of the comprehensive development and the diagrams of the regional layouts of the Karakalpak ASSR, oblasts and rayons, the plans of the layout and development of cities;

the comprehensive goal programs on the formation and development of territorial production complexes, the solution of scientific, technical and social problems, nature conservation and the efficient use of mineral raw material, land and water resources;

the norms and standards of the consumption by the population of material goods and services, the expenditures of fuel, energy and material resources, the need for equipment and cable items, capital investments for the drawing up of the drafts of long-range plans and forecasts;

the drafts of procedural instructions and recommendations on questions of planning and forecasting and the making of technical and economic calculations;

the drafts of plans of scientific research on the most important economic problems and other questions.

The work of the commission is organized on the basis of the plans of the making of an expert appraisal of materials (long-term and annual lists of projects), which are approved by the Collegium of the Uzbek SSR State Planning Committee. This list is formed in accordance with the proposals, which are submitted to the management of the State Planning Committee by its departments, as well as by the Uzbek SSR Academy of Sciences, ministries and departments, associations and scientific and technical organizations, on the basis of the basic directions of the social and economic development of the republic and the plans of scientific research, planning and design and planning and surveying work.

The objectivity of the appraisal of the State Planning Committee stems from its extradepartmental nature and collective nature, which are ensured by the organization of one-time temporary subcommissions for the examination of specific materials, the permanent Experts Commission and its sectorial and problem sections.

Leading scientists, highly skilled specialists and managers of economic organizations are enlisted in the work of the commission, its sections and subcommissions. They perform their functions as experts within the competence of the Uzbek SSR State Planning Committee by the combining of jobs. The staff of the Experts Commission is approved by the Collegium of the Uzbek SSR State Planning Committee for a term of 2 years, the members of the subcommissions are approved by an order regarding the State Planning Committee, in which the period of their activity is also specified. If necessary the developers of the materials, as well as representatives of interested organizations are enlisted when making the expert appraisal.

Thus, a subcommission consisting of 27 people, among whom were a corresponding member of the All-Union Academy of Agricultural Sciences imeni V. I. Lenin, 8 doctors of sciences and 9 candidates of sciences, made over nearly 2 months an expert appraisal of the materials of the Comprehensive Program of Scientific and Technical Progress in the Uzbek SSR for the Period to 2005. The expert conclusions are discussed and approved at the plenary or sectional meetings of the commission. Its decisions are submitted to the management of the Uzbek SSR State Planning Committee, while after their approval are taken into account by the departments of the State Planning Committee when drawing up the drafts of plans and preparing other decisions.

The technology of collective expert appraisal makes it possible not only to give an objective evaluation of the materials in question, but also to discuss extensively and skillfully the urgent problems and to determine the most effective means of their planned solution. Along with this the increase of the role of the technical and economic expert appraisal in case of the preparation and examination of scientific, predesigning and preplanning materials will contribute to the increase of their quality and to the most strict observance of the established scientific methods demands on their elaboration.

Here are just a few examples of the effectiveness of this tool.

The expert appraisal of the Comprehensive Program of Scientific and Technical Progress and the diagram of the development and distribution of the productive forces of the republic, which were submitted by the Uzbek SSR Academy of Sciences, revealed in them a number of significant oversights, which as a whole decrease the level of their elaboration. First of all this is the lack of variant studies of the socioeconomic, scientific and technical problems, although such possibilities show through in the materials. Thus, the basic indicators of the development of agriculture are given in one version, while the indicators of the use of water and land resources have several values, behind which there are different conceptions, which are left without a critical examination. The prospects of the development of the fuel and energy complex were examined in a one-sided manner, mainly the energy direction of the use of natural gas and coal were studied. The weak system of the scientific, especially the technical and economic and the estimated substantiation makes the elaborated indicators and recommendations vulnerable. Thus, the forecast indicators of the size of the population and manpower resources are cited without the revelation of the retrospective and anticipated laws of the demographic development of the republic. In many cases the generally accepted methodology and requirements of the comparability of the indicators were not observed in the calculations.

These and other shortcomings in the materials, which were submitted to the republic State Planning Committee, in many ways stem from the weak role and the low organization of the departmental and interdepartmental appraisal at individual stages of the preparation and examination of these materials, which inevitably gives rise to poorly prepared, crude scientific recommendations. While this has the result that they have to be returned for modification.

The systematic arrival for expert appraisal of the materials, which are necessary for the thorough preplanning study in a specific sequence of all the key problems of the development of the economy of the republic, its rayons, sectors and works, is an important prerequisite of the increase of the efficiency of expert work.

At present the choice of objects of expert appraisal, as a rule, is of a random nature due to the existing substantial shortcomings in the planning and management of research and development, as well as the violation of planning and executive discipline by scientific and technical organizations. All this frequently has the result that the materials arrive late and cannot be checked

in good time by the expert means and be used when preparing the drafts of planning decisions.

First, as was indicated at the June CPSU Central Committee Plenum, a decisive turn of the natural and economic sciences toward the real, practical tasks, which life is posing for our society, and, second, the coordination of the plans of scientific research and planning and surveying work with the needs of planning are urgently required for the increase of the level of the scientific soundness of plans and the increase of the effectiveness of expert work. The practical settlement of these questions should be linked first of all with the elaboration of scientific, technical and economic materials for the formation of such documents of long-range forecasting and planning as the Comprehensive Program of Scientific and Technical Development for 20 Years, the diagram of the development and distribution of productive forces for 15 years and the Basic Directions of the Economic and Social Development of the Republic for 10 Years. Here for the purpose of strengthening the centralized principles in the planning, coordination and cooperation of work and the state monitoring of the progress of its fulfillment it is necessary in the State Plan of the Development of Science and Technology of the Uzbek SSR for 1986-1990 to draft and approve the republic plan of scientific research on the most important economic problems.

#### FOOTNOTE

1. The expert appraisals, which are made by one organization or another with regard to its own and outside developments, which are to be introduced in the given system, should be assigned to departmental system.

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## WORKS VYING FOR KOMSOMOL PRIZES IN SCIENCE, TECHNOLOGY

Moscow KOMSOMOL'SKAYA PRAVDA in Russian 27 Jul 84 pp 1,2

[Article: "From the Commission of the All-Union Komsomol Central Committee for Leninist Komsomol Prizes in the Area of Science and Technology"]

[Text] The Commission of the All-Union Komsomol Central Committee for Leninist Komsomol Prizes in the Area of Science and Technology has examined 148 works, which were done by young scientists, instructors of higher educational institutions, engineers, graduate students and workers and were submitted for the 1984 Leninist Komsomol Prizes. In accordance with the representation of expert groups the commission allowed to participate in the second round of the competition for the Leninist Komsomol Prizes 64 works in the area of science and technology.

In publishing the list of works, the commission requests that the executives of scientific and technical societies, scientific institutions, enterprises and higher educational institutions, as well as the executives of party, Komsomol and other public organizations send their reviews and remarks, as well as the materials of public discussion to the commission before 15 September 1984 at the address: Moscow, Center, Ulitsa B. Khmel'nitskogo, 3/13, the Commission of the All-Union Komsomol Central for Leninist Komsomol Prizes in the Area of Science and Technology. Telephone: 206-85-84; 206-89-08.

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Sumbitted by Gorkiy Oblast Clinical Hospital imeni Semashko, Gorkiy Hospital No 35, the Gorkiy Scientific Research Institute of the Technology and Organization of Production, the Moscow Scientific Research Institute of Microsurgery of the Eye, the Moscow Scientific Research Institute of Cardiovascular Surgery imeni A. N. Bakulev.

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Submitted by the Siberian Scientific Research Institute of the Petroleum Industry, the Yuganskneftegaz Production Association.

7807

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## SEMINAR ON PROBLEMS OF SOCIALIST COMPETITION IN SCIENCE

Kiev EKONOMIKA SOVETSKOY UKRAINY in Russian No 6, Jun 84 pp 93-96

[Article by Doctor of Economic Sciences A. Zolotarev (Kharkov) and Candidate of Economic Sciences V. Andriyenko: "Urgent Problems of Socialist Competition in the Sphere of Science"]

[Text] The republic applied science seminar "Problems of the Increase of the Effectiveness of Socialist Competition in the Sphere of Science," which was organized by the Ukrainian SSR Academy of Sciences, the Institute of Economics of the Ukrainian SSR Academy of Sciences, its Kharkov Department, the Ukrainian Republic Council of Trade Unions and the Ukrainian SSR Ministry of Higher and Secondary Specialized Education, was held in Kharkov at the end of last year. The seminar was devoted to urgent problems of the effectiveness of socialist competition at academic and sectorial scientific research institutions and higher educational institutions.

More than 150 people took part in its work. Among them were representatives of party, trade union and economic organs, scientific research institutes and higher educational institutions, who deal with questions of competition in the sphere of science.

In the opening address Corresponding Member of the Ukrainian SSR Academy of Sciences V. I. Golikov, deputy director of the Institute of Economics of the Ukrainian SSR Academy of Sciences and chairman of the Scientific Council of the Ukrainian SSR Academy of Sciences and the Ukrainian Republic Council of Trade Unions for Problems of Socialist Competition, noted that the party and government are devoting much attention to the increase of the effectiveness of socialist competition in the sphere of science. In this connection it is necessary to devote particular attention to procedural questions, namely the formulation of uniform recommendations on the organization of socialist competition in scientific collectives. These recommendations should be characterized by simplicity in practical use and should meet the lofty requirements of mature socialism and the scientific and technical revolution.

Well-known scientists, specialists and representatives of public organizations spoke at the seminar. Thus, Academician of the Ukrainian SSR Academy of Sciences K. M. Sytnik, vice president of the Ukrainian SSR Academy of Sciences, in his report revealed the basic problems of the improvement of the organization and the increase of the effectiveness of socialist competition in

science. He noted that at the present stage, when complicated and large-scale socioeconomic problems are being solved, science should contribute more actively to the increase of the growth rate of labor productivity, the further intensification of the development of the economy and the combination in practice of the advantages of the socialist system with the achievements of the current scientific and technical revolution. Under these conditions the role of socialist competition as the most important factor of the development of science and the increase of its influence on the achievement of high end results of work is increasing. However, so that this influence would be more reliable, the organization of competition in the sphere of science needs constant improvement, the search for more effective forms of it and skillful supervision on the part of the administration and public organizations.

The speaker singled out the most complicated problems of the organization of competition in scientific collectives: the insufficiently effective use of the forms of competition, which would ensure the greatest comparability of the achievements of the competing workers of science; the lack of a stable, predetermined and unambiguous connection between the expenditures of labor and the results. In this connection K. M. Sytnik proposed to study more thoroughly the available advanced know-how of the organization of socialist competition in the sphere of science on a unionwide scale.

Some important aspects of the organization of socialist competition among scientific collectives were also revealed in the report of Candidate of Pedagogical Sciences N. F. Kharinko, chairman of the Republic Committee of the Education, Higher Schools and Scientific Institutions Workers Union. In the report it was noted that competition on the basis of personal creative plans is of great importance in the increase of the effectiveness of scientific research. However, there is no uniform approach in the organization of competition in accordance with personal creative plans. For the purpose of increasing the effectiveness of competition among scientific collectives, the speaker stressed, it is necessary to place it on a scientific basis and to develop the science of competition, which is capable studying and explaining theoretically all the problems and contradictions of it, which are encountered in practice. The task, first of all, is for all the organizing and educational work of the administration and trade union committees of scientific institutions to be aimed at the assurance of the active participation of all scientists and engineering and technical personnel in the competition, the increase of the effectiveness and quality of research, the strengthening of the ties of scientific and production collectives, the speeding up of the introduction of scientific developments in the national economy and the achievement of high end results.

Ukrainian SSR Deputy Minister of Higher and Secondary Specialized Education and Candidate of Economic Sciences L. A. Kanishchenko revealed in his report the experience of organizing the socialist competition of higher educational institutions of the republic in the sphere of scientific activity. He showed the inadvisability of the use in the organization of socialist competition of a single combined form, which encompasses all the types of activity of the competitors, and revealed the need for the development at higher educational

institutions of special forms of competition, which are aimed at the accomplishment of specific tasks of the collectives of higher educational institutions.

The practical organizational questions of the improvement of the forms of socialist competition for the fulfillment of scientific research comprehensive goal programs in the region were reflected in the report of Academician of the Ukrainian SSR Academy of Sciences V. P. Shestopalov, chairman of the Northeastern Scientific Center of the Ukrainian SSR Academy of Sciences.

The speaker stressed that by now a specific set of interconnected programs, of which the regional comprehensive goal programs (RTsKP's) are an important unit, has been formed. In the northeastern region of the Ukrainian SSR 17 comprehensive scientific and technical programs have been formed. The socialist obligations on the accomplishment of the assignments of the regional comprehensive goal programs are receiving more and more objective reflection in the individual and collective competition of the scientific and production collectives of the Northeastern Scientific Center of the Ukrainian SSR Academy of Sciences. The competition was organized under the motto "The Five-Year Plan Without an Increase of Resources." However, for the increase of the effectiveness of the organization of the socialist competition for the fulfillment of the comprehensive goal programs it would have been advisable to set up at all the scientific institutions, which are responsible for the formulation of these programs, staffs of the competition with the placement at their disposal of the corresponding means of stimulation. Here the cooperation of the staffs with the managers of the program should be ensured.

Doctor of Economic Sciences G. M. Dobrov, chief of a department of the Institute of Cybernetics of the Ukrainian SSR Academy of Sciences, reported on the problems and the means of improving the organization of competition in scientific collectives. The speaker believes that the construction of the mechanism of competition in the sphere of science should take into account the effect and structure of the "formula of success," which is known from systems analysis. It consists in the assertion that success comes about when it is possible to set the goals properly, to select (train) personnel for this and to furnish them with the appropriate technology of activity.

The socialist obligations of scientific collectives should by their content encompass all three groups of conditions of success: the proposing and accomplishment of intensive assignments, the formation of the personnel potential in the process of their fulfillment, the development and assimilation by them of new, more powerful technologies of research activity.

The experience of the leading scientific collectives of the country, including the experience of the collective of the Institute of Electric Welding imeni Ye. O. Paton of the Ukrainian SSR Academy of Sciences, convincingly attests that it is possible to ensure stable success in competition over many years only on the basis of such a systems approach.

The experience of organizing competition in various labor collectives was covered in the majority of reports and statements.

The experience of organizing creative competition at the Kharkov Physical Technical Institute of the Ukrainian SSR Academy of Sciences, the Kramatorsk Industrial Institute and Kharkov Polytechnical Institute imeni V. I. Lenin merits attention.

The development of creative cooperation among scientific organizations, higher educational institutions and production enterprises is contributing to the increase of the effectiveness of competition. The problems of developing competition in interdepartmental scientific production associations were covered in the reports of Candidate of Economic Sciences G. M. Pyzhik, chairman of the Lvov Oblast Council of Trade Unions, and Doctor of Technical Sciences G. A. Sokolovskiy, deputy director of the Institute of Problems of Machine Building of the Ukrainian SSR Academy of Sciences.

The speakers regard as expedient the adoption of annual joint socialist obligations, which will promote the strengthening of the ties between scientific institutions and production enterprises.

The organization of effective competition is impossible without the objective evaluation of the activity of collectives. Individual seminar participants (Candidate of Technical Sciences A. A. Serdyuk, dean of the Kramatorsk Industrial Institute; Candidate of Technical Sciences M. K. Kravtsov, prorektor for science of the Ukrainian Correspondence Polytechnical Institute, and others) devoted their reports and statements to this problem. The report of Candidate of Technical Sciences V. V. Rozanov, chief of the group of the effectiveness of scientific research work attached to the Section of Chemical Technological and Biological Sciences of the USSR Academy of Sciences, aroused particular interest. He examined the questions of the elaboration of a highly efficient procedure of tallying the results of the competition in scientific collectives. The speaker formulated methodological principles, which it is necessary to observe when tallying the results of the competition. According to these principles: it is necessary to record the results of the competition with respect to the total amount of socially useful activity of the collective, and not only with respect to the fact of the fulfillment of the plan and the assumed socialist obligations; to evaluate comprehensively and optimally the activity of scientific collectives; in case of the evaluation of the activity of competing scientific collectives to use qualitative approaches, which provide a scientific base for the making of management decisions and the further increase of the accuracy of the very methods of evaluation, to take into account without fail when tallying the results of the competition the utilization of resources by scientific collectives, that is, the use of the criterion of the production efficiency.

Depending on the established practice of tallying the results of competition in organizations, the speakers at the seminar proposed various methods of the evaluations of its results. Analyzing the experience of organization on the evaluation of the activity of scientific collectives, it is possible to draw the conclusion: the point-expert method of tallying the results of socialist competition is the most widespread and effective.

On this level the method of the Ukrainian Correspondence Polytechnical Institute, according to which the work of all categories of competitors is

evaluated in three aspects: production, publishing and public activity with allowance made for the coefficients of the value of the work, which are determined by the expert method, is of interest.

Other approaches to the evaluation of the results of competition, the basis of which is the use of the point-expert method of tallying the results of competition, are also interesting. Here the principle of comprehensiveness and a systems approach to the evaluation of all the activity of scientific collectives is observed.

The problems of stimulating the competition participants were examined at the seminar. For the stimulation of the winners of the competition Candidate of Physical Mathematical Sciences N. V. Goncharov, a senior scientific associate, proposed a system of stimulation, in which the amount of the bonuses being paid to the leaders of the competition is directly dependent on the place held in the socialist competition.

The questions of material stimulation are closed interconnected with the questions of the moral stimulation of the participants in creative competition. In particular, it was proposed to change the form of the document for the shock workers of communist labor and the times of the confirmation of this title and to revive the practice of conferring the honorary badges "Winner of the Socialist Competition" and "Shock Worker of the Five-Year Plan" on the leaders of the competition of higher educational institutions.

The broadening of the scale of socialist competition requires the special training of its organizers. At present the positions of engineers for competition have been introduced in the manning table at practically all the large enterprises and organizations of the republic. However, the overwhelming majority of them do not have the appropriate theoretical training. Therefore the need is arising to introduce in the syllabuses of higher educational institutions the special course "The Theory and Practice of Socialist Competition." The usefulness of this special course is obvious. In this connection Candidate of Economic Sciences L. I. Novik, docent of the Krivoy Rog Mining Institute, believes that the taking of this course should become an integral part of the training of specialists of the national economy.

V. P. Rybachuk, a consultant of the Central Committee of the Communist Party of the Ukraine, spoke at the seminar. He noted that the use of expert appraisals in the tallying of the results of the competition is necessary for the purpose of the further improvement of educational work with scientific personnel. In speaking about the indicators of socialist competition, V. P. Rybachuk directed the attention of its organizers to the thorough study of the activity of the collective on the basis of the documents which reflect the main directions of the development of the collective. Here it is necessary to orient the collective toward the achievement of the main, priority goals. He stressed the unquestionable usefulness of the seminar in the further improvement of the work on the perfection of the forms of socialist competition.

Corresponding Member of the Ukrainian SSR Academy of Sciences V. I. Golikov, deputy director of the Institute of Economics of the Ukrainian SSR Academy of Sciences and chairman of the Scientific Council of the Ukrainian SSR Academy of Sciences and the Ukrainian Republic Council of Trade Unions for Problems of Socialist Competition, generalized the results of the work of the seminar in his closing speech.

He proposed to set up a creative commission for the elaboration of procedural recommendations, which would reflect the peculiarities of pilot works, academic institutes and higher educational institutions, would cover thoroughly the questions of the organization of competition in scientific collectives and would take into account here the advanced know-how of the union republics and the CEMA countries.

Recommendations, in which the basic tasks were specified, were adopted in accordance with the results of the seminar. The accomplishment of these tasks will ensure a higher level of the organization of socialist competition and the increase of its effectiveness. The recommendations were sent to interested ministries and departments for practical use.

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7807

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## FORECASTING AND LONG-TERM PLANNING OF S&T PROGRESS IN THE LATVIAN SSR

Riga NAUKA I TEKHNIKA in Russian No 8, Aug 84 pp 6-8

[Article by Miyervald Raman, deputy chairman of the Latvian SSR Council of Ministers, chairman of Latvian SSR Gosplan]

[Text] Miyervald Leonidovich Raman (b. Riga in 1925)--deputy chairman of the Latvian SSR Council of Ministers and chairman of Gosplan of the republic. Candidate of technical sciences, honored economist of the LaSSR, laureate of the Latvian SSR State Prize. In 1950 graduated from the Mechanical Engineering Department of Latvian State University, worked as a scientific associate, and later as deputy director for scientific work at the Physics and Power Engineering Institute of the LaSSR Academy of Sciences. Was chairman of the State Committee for Coordination of Scientific-Technical Work of the LaSSR Council of Ministers. Headed the study of an entire series of paramount problems of scientific-technical progress, and the development and introduction of automated control systems and special purpose comprehensive programs. M. L. Raman is the author of over 40 scientific works and 200 publications.

The scientific and technical revolution places increasingly large, complex and in many ways new objectives before the national economy. As noted at the December (1983) Plenum of the CPSU Central Committee, success in attaining them depends on how we mobilize the collectives of enterprises, scientific research and design organizations, and engineering, technical and scientific personnel for the acceleration of scientific and technical progress.

The specific program for the republic in this direction is the Decree of the Latvian CP Central Committee and the LaSSR Council of Ministers "On measures to accelerate scientific and technical progress in the national economy of the Latvian SSR," adopted in 1983 on the basis of the corresponding Union document.

As noted in this decree, a radical improvement of all efforts to accelerate scientific and technical progress and thereby to maximally raise labor productivity must proceed on the basis of consistent implementation of a unified scientific and technical policy, further development of scientific research

and integration of science and production, and wide and accelerated introduction of the achievements of science and technology into practice.

To these most important components of scientific and technical progress one can also add the instruction from the 1968 Decree of the CPSU Central Committee and the USSR Council of Ministers "On measures to increase the effectiveness of work of scientific organizations..." about the necessity to systematically work out scientific and technical forecasts for an extended period (for 10-15 and more years), which must be the basis for selecting the most promising directions for technical progress and effective ways to develop the national economy and its individual sectors, and also the basis for developing a comprehensive program for scientific and technical progress.

In this connection the well-known cycle forecast--concept--plan should be recalled, noting that in the opinion of many Soviet scientists, the system for forecasting in the national economy consists of scientific and technical, demographic, social and economic forecasting as well as of forecasting of natural resources.

It can also be noted that in its time aspect, the system of forecasting is divided into short-term, medium and long-term forecasting. Scientific and technical forecasting is among the long-term kinds. Its task is to forecast the main directions of the development of science, its key achievements, and their possible application on the basis of applied scientific and technical forecasting, that is, the application of what has already been developed by science and technology, and forecasting of the fundamental directions of science and technology.

Here it should be emphasized that forecasting does not supplant the plan, but creates the scientific preconditions for its formation, and has three functions: analysis of objective trends in the development of new phenomena in the problems and contradictions that have arisen; prediction and evaluation of possible directions of future development, their rates and strength; and determination of the possibilities of influencing the process of objective development.

In the Latvian SSR such forecasting evaluations have been worked out in the compilation of the food, power and a number of other comprehensive programs prior to the beginning of any research projects. And still it should be admitted that the depth of forecasting is still far from sufficient.

On the basis of initial data from the USSR Academy of Sciences, the State Committee for Science and Technology, and other Union organs, local development projects and proposals, a Comprehensive program for scientific and technical progress had already been developed twice in the republic, in 1978 and 1983.

The Comprehensive program determines the development of science and scientific and technical progress in 14 sectors and directions of the national economy of the republic. Simultaneously with the development of the program, the problems and scientific and technical directions were specified in which special-purpose comprehensive socioeconomic and scientific and technical programs will be compiled for the 12th Five-Year Plan. Their list is submitted.

At the same time it must be noted that the Comprehensive program does not satisfy us completely. Scientific and technical decisions that have been known for years are prevalent in a number of its sections. It contains insufficient elements of new technologies, capable of radically changing the accustomed and stereotypical production processes, and ensuring a cardinal increase in labor productivity, as demanded by the 1983 decree of the CPSU Central Committee and the USSR Council of Ministers, the decisions of the December (1983) and the special February (1984) plenums of the CPSU Central Committee.

For this reason at the present time, when the decision has already been taken to expand work on the next comprehensive program for scientific and technical progress up to the year 2010, it is necessary to specially and deeply analyze the state of efforts on prediction as well as on the compilation of the long-term comprehensive program, so that its content would correspond to the high requirements of the indicated CPSU Central Committee plenums, at which it was noted that the organization of the entire complex of scientific and technical work is still far from smooth, and that the scope of plans leaves much to be desired. It was emphasized that the basic directions of the development of our economy is intensification, accelerated introduction of the achievements of science and technology into production, and the implementation of major comprehensive programs.

However, despite the mentioned shortcomings, as early as 1982 the concept was worked out for the development of the national economy of the Latvian SSR up to the year 2000. It was approved by the Buro of the Latvian CP Central Committee and confirmed by the Council of Ministers of the republic as a basic document. Together with the Comprehensive program for scientific and technical progress and the Plan for distribution of production capacities, it became the basis for working out the Basic directions of economic and social development for the 12th Five-Year Plan and for the period until the year 2000.

Eleven republic-level scientific and technical programs were developed and included for first time in the 11th Five-Year Plan. The purpose of these programs was to bring the important results attained at institutes of the Academy of Sciences, VUZ's, and sector institutes of the republic into wide application in production. Thus the republic was a five-year period ahead in complying with last year's decree on including such programs in the five-year plans of economic and social development, and today experience is also being accumulated in program-specific planning and management in the area of scientific and technical progress, which is also required by the decree mentioned above.

For example, the successful implementation should be noted of such scientific and technical programs as:

"Development of automated processes for designing, preparation for production and production of technological production equipment." As the result of implementation of program measures at two major enterprises of the republic--RPO VEF [Riga Order of Lenin State Electrical Engineering Plant imeni V. I. Lenin] and PO [production association] Radiotekhnika, an automated system for technological preparation for tool production is in industrial use. For example, at the PO Radiotekhnika this permitted a reduction of workers engaged in these

operations by one-half. The system is operating on an experimental production basis at the Kommutator plant.

"Development and introduction of microprocessor control and inspection systems." As the result of implementing program measures, 20 microprocessor systems and 30 microcomputers were manufactured in 1983 at the RPO VEF, which are already being used for inspection of radio and communications equipment, and are also turned over to other organizations on a contractual basis.

The incomplete fulfillment of some other programs is primarily due to difficulties in financing and procurement of the necessary equipment. With greater persistence these difficulties can and must be overcome.

An important element of long-term planning and development as well as of accelerating scientific and technical progress is a high level of invention, its utilization in production, and the sale of licenses on this basis.

As early as 1979, the Latvian SSR Council of Ministers Decree "On measures for further improvement of invention work in the Latvian SSR and increasing the role of inventions for the purpose of increasing production efficiency" required ministries, department and the Academy of Sciences "...to increase demands on scientific research institutes, project design organizations and enterprises in respect to developing machines, equipment, instruments, production technologies and materials which would be 10-15 years ahead of contemporary world standards in their technical and economic specifications." This demand is not being sufficiently met, although today it is acquiring much more acuity. Only one-third of the scientific and technical projects under way in the republic contains technical elements on the level of inventions.

The technico-economic level of any article is established in the process of its development. If the designers decide on the goal of exceeding the characteristics of the best examples, their way to that goal begins with a patent search. And then it becomes clear which of the world's equipment can be considered a past stage, which ideas it would be desirable to adopt, and which problems will require original technical solutions.

From this it can be seen that the technico-economic level of products being developed can be forecast, and this process can and must be controlled.

However, the estimation materials of a number of ministries: agriculture, local industry, meat and dairy industry, and consumer services still lack an objective estimate of the technical level of the design projects carried out by organizations within their own jurisdiction. Only the Ministry of Health in respect to the development of new instruments, and individual institutes of the Academy of Sciences consider the development of inventions, their significance and subject patentability in evaluating project developments.

Insufficient innovation, and therefore a low technical level of developments carried out at 19 scientific research, project design and engineering organizations in the republic are indicated by the fact that out of 1,473 developments introduced during the year, only 25 (3 percent) contain their own inventions.

The level of the inventions themselves should be mentioned separately. With a relatively large number of authors' certificates received during 1980-1983 (83 for each 100 scientific workers), their influence on the technical policy of the sectors is clearly insufficient.

There are extremely few inventions contributing to the development of competitive products and modern technological processes in such sectors and directions that are traditional for the republic as radio and telephone production, instrument making, food and light industry, and the construction materials industry.

The radio equipment made by the VEF and Radiotekhnika associations, with the exception of the speaker systems, is not competitive due to lagging behind in its technical level and in appearance.

Complaints of being insufficiently competitive could also be addressed to a greater or lesser degree to the products of the PO REZ [Production association of the Riga Order of Lenin Electric Machinery-Building Plant], the Riga Illumination Equipment Plant, the PO Al'fa, the Riga Electric Bulb Plant, the Daugavpils Elektroyinstrument Plant, the PO Elektrostroyinstrument, and others.

At the same, the most recent example: specialists of the VEF and a number of other organizations have built new competition bobsleds which clearly surpass the best world specimens in their technical specifications.

Invention--high level engineering development--rapid industrial utilization of these results--valid protection of rights abroad. The end result of this sequence is a competitive product and a license in the foreign market.

By the beginning of 1984, republic organizations sold 18 licenses abroad, with all the agreements being concluded on the basis of developments of only a few institutes of the Academy of Sciences of the republic: those of organic synthesis, microbiology imeni Avgust Kirkhenshteyn, physics and wood pulp chemistry.

Considerable reserves for accelerating scientific and technical progress, including raising the technical level and competitiveness of industrial products, exist in scientific and technical cooperation with scientific organizations of the country and with research centers abroad.

Joint development with organizations abroad, primarily within the framework of scientific research work coordination plans of the CEMA countries, is carried on by some institutes of the Academy of Sciences, leading VUZ's of the republic, scientific establishments of the Ministry of Health, and some others.

Taking into account the volume of scientific research, the qualifications of scientists and specialists of the republic, and the opportunities for expansion of scientific and technical cooperation, it can be asserted that the organizations of the republic have incomparably greater potential possibilities in the selling of licenses than the results attained so far.

In order to increase the pace of scientific and technical progress and the efficiency of social production in the light of the December (1983) and the special February (1984) plenums of the CPSU Central Committee, it appears necessary to take the following measures in the republic:

--Closely examine the state of forecasting scientific and technical progress here, outline specific measures for its improvement, and determine the organ in charge of this issue. Apparently it would be desirable to establish temporary groups of scientists and specialists in the national economy to develop forecasts.

--Critically examine the comprehensive program for scientific and technical progress in the Latvian SSR until the year 2005, determine its weak points, and take these into account in the development of such a program for the following period with a considerably broader involvement of scientific collectives and specialists from other organizations situated on the territory of the republic.

--In developing the scientific and technical programs for the 12th Five-Year Plan, ensure providing for complete coordination of the measures contained in them with other sections and tables of the plan for social and economic development, so that the needed resources of all types would be completely balanced. In the implementation of these programs developed for the 11th Five-Year Plan, search for ways to sharply improve the timely implementation of planned program measures, to increase the responsibility of the developers and provide for appropriate incentives for high-quality and timely carrying out of the measures with high results.

--Develop comprehensive plans for reequipping sectors and individual industrial facilities. Constantly work on automation of production processes on the basis of using automated tools and machinery, standardized equipment modules, robot equipment complexes and computer equipment. Concentrate efforts on accelerating the building of flexible automated production facilities and systems for automated design work, ensuring a cardinal rise in labor productivity and a sharp reduction in the proportion of manual labor.

--Establish in all sectors of the national economy an efficient procedure for planning safeguards abroad for inventions, industrial samples and trademarks as coordinated with NIOKR [scientific research and experimental design projects] plans, export and sale of licenses.

--Continuously improve the system of scientific and technical information, including using automated systems, devoting special attention to a continuous flow of information about world levels of equipment for forecasting and long-range planning of both present-day technological processes and designs which are assimilated or ready for assimilation.

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2388

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## PROBLEMS IN DEVELOPMENT, PRODUCTION OF INNOVATIVE ACCESSORIES

Moscow MOSKOVSKAYA PRAVDA in Russian 1 Jun 84 p 2

[Article: "Where to Acquire Innovative Accessories"]

[Text] As was noted in the decisions of the 26th party congress and the subsequent CPSU Central Committee plenums, the cardinal increase of labor productivity constitutes the key task of our economy. The sources of the increase of labor productivity are diverse. However, it is possible to group them according to two basic directions--the extensive introduction of the latest equipment and technology and the search for internal reserves of production, of which the extensive promotion of advanced know-how is the most important component. Among the leaders of production there are many efficiency experts, who have developed unique accessories which help to increase the efficiency of equipment by many times. Moreover, practical experience shows that a worker of average skill at a machine tool, which is equipped with advanced accessories, can stably achieve high labor productivity.

However, the metalworking equipment, which is mainly used at enterprises, is poorly "clothed." While many accessories, which have been developed by innovators and promote the intensification of operating production, frequently exist in a single copy, their mass production has not been set up. This was also spoken about in the articles, of which B. F. Danilov, a turner-pattern maker and innovator, was the author. They were called as follows: "What to 'Dress' a Machine Tool in," "An Innovation Without Circulation," "High-Speed Drawing Instruments," "The Accessories of Drill Operator Aleksandr Komyagin," "The Paternal Machine Tool" and others. In them essentially the same problem was examined from one point of view or another: why innovative accessories are not copied, how and where plants are to acquire them. There is no unified state system, which would guarantee the mandatory introduction everywhere of the most universal and advanced accessories, which have been developed by experienced plant workers. The editorial office has had to return repeatedly to this theme, since the USSR Ministry of the Machine Tool and Tool Building Industry, which is responsible for the improvement and the increase of the efficiency of the operation of the machine tool pool, has not proposed a radical solution of the problem.

After the publication of the next article entitled "Always About the Same Paternal Machine Tool," which was printed in MOSKOVSKAYA PRAVDA on 11 October 1983, the editorial office received a reply signed by Deputy Minister of the Machine Tool and Tool Building Industry I. A. Ordinartsev. It is stated in it that for the purpose of studying and selecting prototypes of tools and accessories, which have intersectorial application and are promoted by innovators, representatives of the Ministry of the Machine Tool and Tool Building Industry visited the Moscow City Council of the All-Union Society of Inventors and Efficiency Experts and the Moscow House of Scientific and Technical Propaganda imeni F. E. Dzerzhinskiy. "A meeting with B. F. Danilov took place at the All-Union Scientific Research Institute of Tools. The questions of the organization of the centralized production of advanced innovative accessories were discussed at this meeting. As a result 11 descriptions, which are being recommended for further consideration, were selected. For the study of the question, which was raised by the newspaper, of the copying of the efficiency proposals of workers the Ministry of the Machine Tool and Tool Building Industry made the decision to assign to the Scientific Research Institute of Technical Information on Machine Building the functions on the gathering of information on highly efficient accessories and to set up a working group of specialists, which will be charged with the organization on the examination, selection and evaluation of the proposals of innovators."

In this reply a practicable solution is noted only in outline. Yuriy Petrovich Zavgorodniy, director of the Scientific Research Institute of Technical Information on Machine Building, told about it in greater detail:

"The decree of the CPSU Central Committee and the USSR Council of Ministers, which was adopted in March 1980, specified the main directions of the further development of the machine tool building sector, first of all the improvement of the structure of the equipment being produced, the development of fundamentally new types of metal cutting machine tools, forging and pressing and casting machines, the extensive introduction of a low-waste processing method, automatic and semi-automatic machines, robotics and so on. The realization of what was outlined should contribute to the accomplishment of the basic task--the intensification of all machine building production. But, of course, there will always be innovators, efficiency experts and people of a creative mentality and character, who will propose many improvements. Thus, the publicizing of innovative accessories will never lose its topicality. The means, about which Deputy Minister of the Machine Tool and Tool Building Industry I. A. Ordinartsev briefly spoke and which to a certain degree repeats our method of assimilating advanced know-how, will make it possible to shorten the time of its introduction.

"The essence of its organizational principle is as follows. The Scientific Research Institute of Technical Information on Machine Building gathers all the information on the achievements of science and practice and selects what is most necessary for introduction at the plants of the sector. The ministry promulgates an order, in which it is clearly enumerated, what should be assimilated at what enterprises. Our institute checks the fulfillment of the order. The enterprises at the end of the year are obliged to report to the ministry on the used innovations and the obtained economic impact. Depending

on the practical results the production workers contribute to the centralized fund of the ministry specific amounts, which are intended for centralized stimulation. A number of general problems, which are connected with the assimilation of new equipment, remain unsolved. At the same time for the introduction of innovative accessories this organizational principle, it seems, is most promising and can be used in any sector.

"People will ask, how are innovators to get their bearings (for in Moscow there are 89 sectorial institutes of information) and how in practice will the interrelations of both parties be formed? First of all a list of the institutes should be available in the council of innovators and in the council of the All-Union Society of Inventors and Efficiency Experts. The workers of these organizations will always be able to suggest to efficiency experts, to which of the institutes, when and to whom they should turn with their proposals.

"While knowing the overall state of affairs, but at the same time not being developers of new equipment, the specialists of the institutes of information will treat the ideas of innovators with the maximum objectivity. After discussion and selection the proposals will be turned over to a working group of the ministry, of which leading specialists of the sector and executives of scientific research and planning institutes and scientific production associations are members. It is included in its duty to give an objective evaluation of the selected innovative developments, to make a final decision and to specify the production volume and the addresses of introduction. The sectorial institute or regional institutes of information, which have duplicating equipment, carry out the copying of the sketches of the innovative accessory, freeing the plant, at which the innovator works, or the performer plant from work which is not characteristic of it.

"We have some experience in the assimilation of the production of innovative accessories. The prototype of the key for a lathe chuck of innovator A. K. Semenov was reproduced at the Grodno Production Association, which produces equipment accessories. It turned out to be insufficiently technologically effective for series production. Having preserved the idea of the innovator, the engineers of the plant made adjustments in the sketches and produced 10 prototypes, which it is proposed to test at the Experimental Scientific Research Institute of Metal Cutting Machine Tools. The cutter of innovator M. Zaytsev in three modified versions was prepared for production at the Sestroretsk Tool Plant.

"The final introduction of such a system, which does not presume any capital expenditures, requires the more thorough study of a number of specific questions, including the interrelations between the sectorial and regional institutes (or centers) of information, and some redistribution of duties. But the system will be able to operate successfully on a state scale only if the Committee for Inventions and Discoveries adopts the corresponding directive decisions and checks most strictly their fulfillment."

From the Editorial Office

The arrangement, which was proposed by the machine tool builders, is actually attractive for its practicability. At the same time it requires the reorganization of the mechanism of the now prevailing procedure of the acceptance, approval, introduction and stimulation of the efficiency proposals and applications of innovators, which, of course, is not accomplished without the corresponding directive documents. However, much psychological readjustment of the system of thinking, which was formed long ago and operates according to an adjusted plan, should precede their elaboration. But often, as is known, it is more difficult to achieve this than to start the most complicated mechanism. Especially when the rearrangement of the work of a large number of people is required.

Perhaps, a different solution will prove to be more efficient. Let the State Committee for Inventions and Discoveries be the arbitrator, but on the strict condition that the time for the search for a different proposal and its implementation in practice is extremely limited. The condition is necessary, since an extra-important task of today is to find the possibility for the drastic increase of labor productivity. But we frequently dispose of time more than inefficiently. The key for the lathe chuck was developed by A. K. Semenov many years ago. Only now has a prototype been made at the plant, the Experimental Scientific Research Institute of Metal Cutting Machine Tools should still evaluate it. When will they receive the key at enterprises? But every lathe operator, who works at a medium-sized or large lathe, needs it.

The implementation of the measures, which were spoken about in the reply to the editorial office, has dragged on unpardonably in time. It is dated in December of last year; the order on the setting up of a working group for advanced tools and accessories in the Ministry of the Machine Tool and Tool Building Industry was promulgated at the end of February of this year. Only in May was it determined that 12 developments, which had been selected at the meeting with innovators, had been turned over after approval by the working group to the corresponding design and technological institutes of the ministry. How many months (years) will be needed for these innovative developments to see the light? And if the proposed system proves to be acceptable, what time is necessary for its introduction?

7807

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## POKROVSKIY BOOK ON SCIENTIFIC AND TECHNICAL PROGRESS REVIEWED

Moscow PLANOVYE KHOZYAYSTVO in Russian No 7, Jul 84 pp 126-128

[Review by A. Kolesnikov, candidate of economic sciences, and N. Lavrenov, candidate of economic sciences, of book "Uskoreniye nauchno-tekhnicheskogo progressa (organizatsiya i metody" [The Acceleration of Scientific and Technical Progress (Organization and Methods)] by V.A. Pokrovskiy, Moscow, Ekonomika, 1983, 216 pages]

[Text] In the book being reviewed planning, organizational and economic methods in accelerating scientific and technical progress as applied at all management levels in the national economy are considered. The book contains an analysis of the effect of science on economic efficiency and recommendations on improving practical work in the use of scientific developments and reducing the "science-production" cycle.

The author defines the role of state science and technology policy as a most important factor in the acceleration of scientific and technical progress. Formation of a rational structure for the national economy is the main aim of science and technology policy. This requires the implementation of a set of measures, including improvement in the efficacy of management in the development of science and technology, justification of the choice of capital investments, acceleration in the rates of renewal for output produced, and improvement in the subjective factor in social production.

The book offers a criterion for the effectiveness of management in scientific and technical progress such as insures the proper direction in production so as to satisfy social needs, and it rightly notes that optimization in management is achieved only as a trend. Notwithstanding, outstripping the world level in the most important directions in science and technology is a task for the years immediately ahead, and not a long-term goal, as the author suggests.

The monograph recommends the development of a special program for retooling the national economy in order to eliminate uncoordinated plans for the development of science and technology and output production plans. Overcoming these difficulties is seen in improvements in the organizational structure for the management of scientific and technical progress and a corresponding restructuring of the planning system, with a leading role assigned to the plan for the development of science and technology.

In the first chapter of the book being reviewed insufficient attention is paid to scientific and technical progress as a factor in the active transformation of social needs. It would have been apropos to offer a more detailed analysis of the links between program and planning documents and operations involved in their formation.

The second chapter deals with the efficient organization of scientific activity as the basis for accelerating the development of science and technology. Characterizing the status and utilization of the scientific and technical potential, the author notes both the positive and the negative phenomena.

The important causes of shortcomings include inadequate planning work. It is therefore suggested that a unified comprehensive methodology be introduced for technical-economic planning for the activity of the scientific organizations (analogous to the Standard Methodology for Compilation of Enterprise Technical, Industrial and Financial Plans). This chapter provides an extensive characterization of the sections of such a plan, the basic principles and methodological tenets in forming it, and a system of indicators.

The author emphasizes the need to further develop the system for planning, funding and economic incentive for developments on the basis of schedule-orders. A standard form of schedule-order is recommended, together with sector funding sources for developments and principles for the formation of incentive funds. A number of interesting proposals for the development of economic methods for accelerating scientific research are substantiated (partial pricing for scientific output, allocation of scientific organizations' own circulating capital, normativs for the creation of common funds for the development of science and technology, extension of the use of credit and so forth).

The chapter concludes by throwing light on the problem of the organizational structure of scientific-production complexes and improving results from scientific labor. Various forms of integration for science and production are considered, and a criterion is offered for selecting optimal organizational forms. At the same time questions of optimization in internal complex structures are not covered. The inclusion of an indicator for the scientific-technical level of research and development among the limit indicators is hardly justified. When themes are included in the plan the great degree of indefiniteness in results from the scientific quest does not permit previous determination of the level below which development results should not fall. This applies particularly to research based on discoveries and inventions.

In the third chapter an analysis is made of the problem of developing program, goal-oriented planning and management in scientific and technical progress. Characterizing the goal-oriented scientific and technical programs the author rightly notes that program methods in planning supplement traditional methods but do not replace them. A detailed review is made of the Comprehensive Program for Scientific and Technical Progress Through the Year 2000 and the directions in which its developments can be improved in light of the CPSU Central Committee and USSR Council of Ministers decree of 12 July 1979.

It is noted in the book that methodological unity exists in program planning, and methodological recommendations are offered on the formation of scientific and technical programs, and it is proposed that a unified methodological approach be worked out for evaluating the effectiveness of all economic measures, including capital construction, the introduction of new equipment, and environmental protection. It is recommended that for the most important programs economic incentive funds and special organs for material-technical support be created, that opportunities for forming ad hoc collectives be extended, and that a program control center be set up at the national level, and so forth.

Many of these proposals have already been implemented. In particular, provision has been made for first-priority resource support for the goal-oriented programs, and regulations on ad hoc collectives and a number of other documents have been promulgated. Some of the recommendations, however, require further discussion and substantiation.

The fourth chapter contains a review of conditions in accelerating the realization of scientific and technical achievements. Noting that a considerable proportion of machine tool output requires renewal, the author proposes a number of measures aimed at raising the level of new equipment. For example, enhancing the role of standardization (assigning the State Committee for Standards not only a monitoring function but also responsibility for the technical level of production and the quality of output), involving consumers more broadly in work on evaluating output, organizing an automated control system for the technical level and renewal of articles, introducing in the state plan a subsection "Assimilation of the Most Important Inventions," planning the buildup of volumes of new output during the first 3 years of production and so forth.

New planning forms and accountability connected with the stages in the introduction of new equipment, and also its economic effectiveness, are now being introduced. Notwithstanding, the efficacy of the economic levers in accelerating scientific and technical progress remains inadequate: awards for new equipment in industry are considerably lower than for increases in production volumes, and the proportion of additions to wholesale prices for equipment of a high technologic level is small, but the proportion of discounts for obsolete articles is much lower, and so forth. The book therefore recommends innovation in the accounting system, economic incentive for the development and introduction of new output, and pricing.

Much attention is paid to an analysis of factors of indefiniteness in the development and introduction of new output and accounting for them in the economic mechanism. "... Given an a priori evaluation of economic parameters associated with the implementation of scientific and technical measures," the author writes, "it is most expedient to switch from a deterministic statement of the task to a quasistochastic presentation, when relatively insignificant random processes are superimposed on the deterministic model." (page 169). In addition to cases of scientific and technical failure, the latter include change in the quality and price for raw materials, materials and subassemblies. However, with the introduction of technologies at the

highest world level, consideration of these factors entails going rather farther than the author suggests from a deterministic statement of the task in predicting economic indicators. As the result of technological improvements over the past 25 years, the productivity of computers, for example, has increased by a factor of 10,000. It is thought that the deterministic model is unable to reflect the dynamics of economic indicators, whose basis is similar growth in machine productivity.

In the fifth chapter an analysis is made of directions for further improvements in management in the development of science and technology. Reinforcing the intersector nature of scientific and technical development requires that more attention be focused on the final product of technical progress, namely the creation of integral technologic systems accumulating achievements in the various sectors. The creation of technologic centers in individual sectors is directed toward this. On the larger scale, the book notes, it is necessary to do in-depth work at the national economic level. To this end, it is recommended that intersector technologic centers be set up through the State Committee for Science and Technology under the scientific leadership of the USSR Academy of Sciences, and that a number of steps be taken to bring order to the network of scientific research and design organizations.

Analyzing the difficulties in combining sector and territorial management of scientific and technical progress, the author suggests implementation of a number of measures to improve the comprehensiveness of management for scientific and technical progress, the creation of organs to manage the development of science and technology in the union republics, and the formation of tasks for intersector scientific and technical programs on a regional basis. At the same time organs for coordinating the development of science and technology already exist in a number of republics, and note is made of this in the book. On the other hand, the intersector (and likewise interregional) nature of the creation and spread of the most important technical innovations requires purposeful and centralized leadership and considerable concentration of efforts, and this is by no means always insured at the republic level.

The chapter ends with a proposal on the development and implementation of a comprehensive program to improve management of scientific and technical progress. This is urgent and it is only to be regretted that it was mentioned so casually.

Despite individual flaws the book deserves a positive assessment. It will be useful for economic leaders, scientific workers, and specialists at scientific research institutes and enterprises.

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9642

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## MATHEMATICAL METHOD PROPOSED FOR PREDICTING EQUIPMENT NEEDS

Moscow PLANOVOYE KHOZYAYSTVO in Russian No 8, Aug 84 pp 118-120

[Article by I. Popova: "Prediction and Long-Term Planning for Equipment in Sector Head Scientific Research Institute Design Bureaus"]

[Text] Planning for the development of new equipment is now impossible without preliminary prediction work that makes it possible to see tomorrow better and make substantiated decisions. One essential condition that determines the quality, reliability and accuracy of predictions and long-term planning is the comprehensive approach to their implementation. This approach is designed to link together the scientific and technical, economic and social aspects of a project under consideration and to make a comprehensive assessment of a large number of alternative ways to develop the project according to the criteria of expenditures, quality and probability of realization.

The average time for the development of today's complex technical systems (CTS) is 8 to 10 years.\* During this time, project decisions can become substantially outdated. In order to avoid this, when selecting any given decision it is necessary to consider the largest aggregate of information on the subject. The timeliness of practical utilization of inventions, discoveries and other kinds of patent information is one of the main conditions for profitability and competitiveness in technical systems.

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\* The complex technical system is a set of technical systems, units and devices that are combined together in order to carry out specific functions. They include airplanes, ships, computers, automobiles and so forth. As it carries out an independent function, the complex technical system simultaneously interacts with the medium in which it operates, and together with this medium forms a large technical system (LTS). In civil aviation the CTS is the passenger airplane and the medium is the airline networks together with the airport services system, and together they form an LTS. In maritime transport the CTS is the ship that together with the communications network and ports system forms the LTS. In road transport the LTS is the vehicle together with roads, load pickup and delivery points, refuelling stations and technical services.

Expenditures on scientific research and test and design work make up a substantial part of total costs in the development of new equipment. It is also worth noting that even though expenditures at the stage of preliminary planning work amount to only 2-4 percent of total development costs, it is precisely at this stage that about 70 percent of the most important decisions are made that determine the fate of the development as a whole.

The successful operation of the head scientific research institute design bureau and development of the sector direction in research that supports it depend largely on how correctly prospects are determined for development in a given direction of research.

The following stages can be distinguished in prediction and long-term planning for technical systems: establishing the goals in the development of technical systems and determining system requirements; looking at alternative ways to develop the system and effective means for achieving the goals; comprehensive assessment according to the criteria for expenditures, quality, lead time and probability of realizing a large number of alternative options; forming a strategy for the development of the technical systems developed in a given scientific research institute design bureau; analyzing possibilities for resource support in realization of the selected strategy; determining optimal time periods for reaching the goals set; and revealing the constraints affecting the process of realizing the selected strategy and ways to eliminate them.

Resolution of these tasks presupposes observance of the principles of the interrelationship and coordination of predictions at various levels, consideration of external conditions and other aspects in the development of a project, agreeing methods and means for prediction, and continuity in prediction, requiring amendments to predictions as new data become available.

The variety of content in the stages of prediction and long-term planning for the development of a CTS makes it advisable to divide the tasks corresponding to stages according to functional direction, and also according to the methods and means by which they are resolved, into the task associated with the generation, evaluation and selection of promising project decisions, and the task aimed at determining the range of ways to develop the components of the technical systems, revealing their functional-technical characteristics, and determining the qualitative jumps in the development of individual components and the times at which these jumps will occur. The common informational basis for these tasks is the data base for project decisions, consisting of the aggregate of data and programs insuring the acquisition, amendment, selection and processing of data and a system for controlling this. A three-level structure for presenting data in matrix form is organized in the data base for project decisions. The elements of this structure are the input, intermediate and final matrices for the attributes of the CTS layout diagrams. The attribute matrices are formed according to common principles and form by means of combining a large number of elements (attributes) in the layout diagram, and the many versions of the diagram. Each version of an attribute corresponds to a definite aggregate of descriptive and numeric data that identifies it among a large number of attributes. Construction of the data base for project decisions starts with the formation of the input matrices, which reflect various versions

of attributes obtained by analysis and appropriate processing of domestic and foreign CTS plans in general, and the individual versions of their components on the basis of patent analysis.

Data acquired on the basis of analysis of input and intermediate matrices (the development matrix, the present-situation matrix, the hypothetical-options matrix) are used to select and substantiate new scientific research work and serve as reference material for current design and technologic tasks.

The final attribute matrix is formed from the input matrices, and with the aid of the former it is possible to obtain various layout diagrams.

Predicting the development of technical systems and their components and clarifying the limits of growth in their characteristics are done on the basis of constructing logistic curves for previous development from statistical data from past and present scientific research and test and design work. Patent analysis and an institute's own scientific research and test and design work make it possible by using the trends identified to construct a range of predictive logistic curves. The most promising directions in the development of individual CTS components are determined with the aid an algorithm for maximizing the function characterizing improvement in the CTS components.

Let us consider the main propositions in the derivation of this algorithm.

Let a certain generalizing function  $P$  characterize progress in the field of improvements in CTS components. In a general case function  $P$  depends on time and is stepped. It is a generalized characteristic for an aggregate of independent parameters. Each time interval corresponds to definite values for the determining characteristics that reflect the objective level of development in the corresponding components. Proceeding from this, for each time interval it is also possible to establish certain ideal values for the data describing the characteristic. If the actual characteristics are related to the ideal characteristics for a given period of time, then we obtain relative dimensionless indices  $a_1, a_2, \dots, a_n$ . Specific values for actual and ideal characteristics are obtained from statistical processing of data for the retrospective period of time and by predictive extrapolation.

Let us assume that the aggregate of these characteristics affects function  $P$  in a specific way.

$$P(\Delta T) = a_1^k a_2^k \dots a_n^k \Delta T,$$

where  $k$  is the degree of influence of the CTS determining characteristics on function  $P$  in a given time interval  $\Delta T$ .

In order to describe large time intervals the generalizing prediction function must be shown in the form of a step function since it characterizes the abrupt switch from one evolutionary cycle to another in the development of determining characteristics, while function  $k$  will increase smoothly. For the duration of one evolutionary cycle, that is, during a relatively small time period, function  $P$  can be shown as an exponential function of the aggregate of the

determining characteristics. It follows from this that for two evolutionary cycles corresponding to time intervals  $T_1$  and  $T_1 + 1$  we obtain the following dependencies:

$$P_i = a_{1i}^{k_i} a_{2i}^{k_i} \dots a_{ni}^{k_i} T_i \quad (1)$$

$$P_{i+1} = a_{1i+1}^{k_{i+1}} a_{2i+1}^{k_{i+1}} \dots a_{ni+1}^{k_{i+1}} T_{i+1}$$

$$\begin{aligned} P_i &= P_{i+1}, \\ P_{i+2} &= P_{i+1} + \Delta P_{i+1}. \end{aligned} \quad (2)$$

By taking the logarithm of expression (1) and making the corresponding transformations to the permutation in expression (2) we get:

$$k_i = \frac{\ln \frac{T_{i+1}}{T_i}}{\ln \frac{\prod_{j=1}^n a_{ji}}{\prod_{j=1}^n a_{ji+1}}}$$

By knowing the value  $k$  from  $m$  preceding periods it is possible to determine its value for a predicted period. In this case the best method for predicting the value for  $k$  is the method of exponential smoothing in which the value for  $k$  is most influenced by its most recent values in the time series

$$k_{i+1} = \sum_{i=1}^m k_i a_i, \quad \sum a_i = 1$$

$a_i$  are weighted coefficients.

Thus we find the new values for  $k$ .

In accordance with equation (1) for different versions for combinations  $a_1, a_2, \dots, a_n$  we obtain versions for the development of function  $P$ .

Then the optimization task for maximizing function  $P$  is solved:

$$P^h = \{a_i\}, \quad \max P$$

that is, we consider the different sets of  $a_1, a_2, \dots, a_n$  and select those that insure the greatest progress in improving the components of the CTS.

The next stage in the process of forming an optimal strategy for the development of the CTS is the machine generation of different versions of the layout diagrams, checked for conformity with the following constraints:

--whether the version obtained provides for given functional-technical requirements;

--what degree of continuity there is in the construction (that is, the version being considered is compared with a CTS that is under testing or in series

production or operation, and the degree of technical and technologic preparedness in production is determined);

--the amount of work that has been done on the scientific-technical idea (that is, what proportion of elements in which version has been the subject of scientific research and development within the framework of a given institute).

The versions obtained are subjected to economic evaluation, which consists of selecting the versions that offer maximum technical-economic effectiveness with minimum costs for development, production and operation. The next stage of the evaluation is associated with the feasibility of realizing each version and determining development time and costs, and also the level of quality in the future CTS. Depending on the tasks facing the scientific research institute design bureau those versions (projects) are selected that enable either minimization of total costs to develop the CTS, or that enable reductions in development time, or that enable sharp improvement in the quality of the future system, or that make it possible to achieve maximum probability for realization given specific costs, time and level of quality.

Evaluation of the versions ends with an analysis of the consequences stemming from the development of new technical systems, taking into account the scales of their application in related branches of science and technology. After the multiple-criterion evaluation has been made, the prospects can be seen for the promising versions of CTS based on fundamentally new decisions and insuring a substantial growth in the quality and efficiency of the new equipment.

The methodological approach considered for the development of a comprehensive system for preparing, forming and evaluating long-term scientific and technical decisions makes it possible to use the results obtained when drawing up plans and compiling thematic programs for scientific research and test and design work, form scientifically substantiated tactical-technical requirements for a CTS, consider in adequate detail the large number of alternative options and assess them according to the criteria described above, and use the results from work on the system not only to determine promising directions in investigative scientific research work but also to realize current developments.

It should be noted that the comprehensive system proposed for preparing, forming and evaluating long-term scientific and technical decisions and the models used in it can be partially realized and then function automatically in automatic mode, and their introduction does not therefore require additional expenditures or significant organizational restructuring.

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9642

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## REPORT ON ANNUAL MEETING OF GEORGIAN ACADEMY OF SCIENCES

Tbilisi ZARYA VOSTOKA in Russian 5 Apr 84 p 3

[GruzINFOR report on annual general meeting of Georgian SSR Academy of Sciences held in Tbilisi, date not specified: "Scales of Research--At Annual General Meeting of Georgian SSR Academy of Sciences"]

[Text] The combination of basic and applied research, drawing of scientific developments closer to the needs of the national economy and very strong work ties with industry and agriculture--such are the chief directions of the work of the Georgian SSR Academy of Sciences in the third year of the 11th Five-year Plan.

The economic effectiveness of the researches of the republic's scientists introduced into the economy in 1982 is valued at 57 million rubles, it was stated at the annual general meeting of the Georgian Academy of Sciences held in Tbilisi.

Achievements of the republic's researchers in the past year, problems of organization of science and its role in modernization of very important technologies and in raising the material well-being of the laboring people of the republic were touched upon in the introductory remarks of Ye. Kharadze, the president of the republic's Academy. He pointed out the leading role of scientists in acceleration of scientific-technical progress, including representatives of the social sciences and indicated the need for further improvement of research along this direction. In the speech the growing role of the academy and its scientific institutions in the localities was emphasized.

The president stated with satisfaction that the first corresponding members of the Georgian Academy of Sciences appeared in Adzhar ASSR, South Osetian Autonomous Oblast and in Kutaisi. The urgency of the problems relating to raising the level of ideological work, education and upbringing of the young generation was emphasized.

Academician Secretary, Academician of the Georgian Academy of Sciences E. Sekhniashvili presented a report on the results of the work of the republic's Academy of Sciences in 1983.

At the meeting, secretary of the Central Committee of the Communist Party of Georgia, spoke at the meeting.

It was pointed out in the report and speeches that in reporting year the efforts of the Georgian SSR Academy of Sciences were directed at the implementation of the decisions of the 26th CPSU Congress and the 26th Congress of the Communist Party of Georgia and subsequent plenums of the CPSU Central Committee and the Central Committee of the Communist Party of Georgia. The decisions of the 6th Plenum of the Central Committee of the Communist Party of Georgia played an important role in the fundamental revision of science and improvement of scientific-technical progress in the republic. Scientists actively cooperated in fulfillment of the plans of the 11th Five-Year Plan and in boosting labor productivity and efficiency of public production. In the solution of tasks of further intensification of all sectors of the national economy the forefront was taken by questions of rapid payoff of invested resources, improvement of the system of introduction of development, interaction of research and practical workers and planning and management of scientific-technical progress.

Intensive search for reserves in the field of scientific progress was continued. This is all the more pertinent because the country's economy is assuming the path of intensive development. The solution of a large and intricate complex of scientific-technical problems arising in this connection primarily depends on bolstering the effectiveness of science itself and intensification of the process of scientific creativity.

An important place in the work of the Academy of Sciences is occupied by the solution of the problem of organizational fusion of science and production, and a partnership and cooperation of the resources of scientists and production people are being established. Last year was particularly fruitful in this regard, which contributed in particular to the creation under the presidium of the republic's Academy of Sciences of a sector of partnership and organization of introduction. Nine academic institutes concluded 17 partnership agreements with 12 enterprises and associations.

One of the most important events of last year may be considered to be completion of the 20-year--up to 2005--forecast of the development of the republic's science and scientific-technical progress.

Major theoretical and scientific value to the economy is presented by researches connected with the planning of the Caucasus Pass [pereval'naya] Railroad, the erection of a base electric power station in Georgia, the compilation of long-range forecasts of the development of individual regions of the republic entitled "Georgia-2000, Regions," rational utilization of the Chiatura manganese deposit, further improvement of working conditions on the Zestafoni Ferroalloy Plant and so on.

Intensive researches are going on in the Academy's institutes connected with the development of powder metallurgy in Georgia, researches on high-production technological processes and problems of creating material resistant to corrosion, internal-combustion engines of a new type and new effective therapeutic

preparations. Much attention is being devoted to forecasting of earthquakes, perfecting an automated control system, problems of protection of the environment, development of Kolkhida, rational utilization of resort resources, the creation and wide-scale employment of enzymatic preparations in the economy and so on.

Important results were obtained contributing to the realization of the food program. These involve work in the field of genetics and selection, raising productivity of cropping and animal husbandry, application of chemicals in and mechanization of agriculture, rational utilization of land resources and physico-chemical technology and others. Economic, social and legal problems of the agroindustrial complex are also being worked out.

Representatives of the humanitarian and social sciences worked intensively and fruitfully. Their sharp rise in the republic was helped by work on implementation of the decisions of the June (1983) Plenum of the CPSU Central Committee and the 14th Plenum of the Central Committee of the Communist Party of Georgia, and measures connected with the 165th anniversary of K. Marx's birth and the 200th anniversary of the Declaration on Georgia. Numerous monographs, books, scientific articles, statements and speeches of scientists in the press and to audiences and special issues of all periodical publications of the republic's Academy of Sciences.

In the statements and speeches, it was emphasized that discussion at scientific institutions of the project of the school reform showed how much scientists are doing for the improvement of teaching programs, textbooks, methods of teaching and training, matters on which the level of schoolwork depends.

At the same time, it was pointed out in the report and speeches that defects slowing the introduction of scientific developments have still not been eradicated. Obstacles in the way of scientific-technical innovations in the economy are frequently explained by imperfection of the system [missing letters], which permits [missing word or letters] obligatory utilization of innovations. Sometimes it is due to production people declining to introduce a promising but demanding development. And this is something for even the scientist to think about.

Much has to be done for the eradication of defects pointed out at the 26th Congress of the Communist Party of Georgia and the 6th Plenum of the Central Committee of the Communist Party of Georgia.

Awards were conferred at the meeting of the Georgian SSR Academy of Sciences. The Prize imeni P.M. [letters missing]kishvili for a series of work in the field of chemistry and physics were awarded to corresponding member of the Georgian Academy of Sciences L. Khananashvili, Candidate of Sciences V. Tskhov-[letters missing]shvili, O. Mukbaniani and L. [letters missing]kaidze; the Prize imeni A. [letters missing]madze for work in the field of mathematics to Doctor of Physico-Mathematical Sciences Z. [letters missing]turiya; the Prize imeni I. T[letters missing]nishvili for the best work in the field of biology and medicine to Doctor of Medical Sciences K. Nadareishvili; the Prize imeni A. Dzhaparidze for researches in the field of geology to Doctor of Geological-Mineralogical Sciences T. Lominadze.

Medals and prizes of the Georgian SSR Academy of Sciences, instituted in 1977 for young scientists and students were awarded to: junior scientific worker of the Institute of Geology imeni A. Dzhanelidze of the Georgian Academy of Sciences, Candidate of Geological-Mineralogical Sciences Z. Kuteliya, senior scientific associate of the Institute of Economics and Law of the Georgian Academy of Sciences Candidate of Economic Sciences, student of the physics [(?)] faculty of Tbilisi State University G. Okruashvili, students of the faculty of power engineering of Georgian Polytechnic Institute imeni V.I. Lenin M. [letters missing]madze, B. Chumburidze, T. [letters missing]dzhishvili and student of the mechanical-machinebuilding faculty of Georgian Polytechnic Institute imeni V.I. Lenin. M. Budagashvili.

The general meeting of the Georgian SSR Academy of Sciences adopted a resolution and approved the directors of the Academy's scientific institutions.

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